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**From Bad to Worse: The Relationship between Changing Inequality in Nearby Areas and
Local Crime**

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From Bad to Worse: The Relationship between Changing Inequality in Nearby Areas and Local Crime

Abstract

There is growing recognition that criminogenic neighborhood effects may not end at the borders of local communities, that neighborhoods are located relative to one another in ways that shape local crime rates. Inspired by this insight, this research explores the changing spatial distribution of race and income around a location and determines how such changes are associated with crime patterns and trends in neighborhoods in the southern California region. We examine how changes from 2000 to 2010 in the income composition, the racial composition, and the intersection of these two constructs are linked with changes in levels of crime across local areas. We find that neighborhoods experiencing greater increases in spatial inequality in a broader area (2.5 miles around the neighborhood) experience greater increases in crime levels in the focal area over the decade, and that this pattern is strongest for neighborhoods that are simultaneously experiencing increasing average household income or increasing inequality. We also find that neighborhoods simultaneously experiencing increases in inequality and racial/ethnic heterogeneity experience increases in crime.

Keywords: neighborhoods, crime, egohoods, spatial effects, inequality.

Bio

John R. Hipp is a Professor in the departments of Criminology, Law and Society, and Sociology, at the University of California Irvine. His research interests focus on how neighborhoods change over time, how that change both affects and is affected by neighborhood crime, and the role networks and institutions play in that change. He approaches these questions using quantitative methods as well as social network analysis. He has published substantive work in such journals as *American Sociological Review*, *Criminology*, *Social Forces*, *Social Problems*, *Mobilization*, *City & Community*, *Urban Studies* and *Journal of Urban Affairs*. He has published methodological work in such journals as *Sociological Methodology*, *Psychological Methods*, and *Structural Equation Modeling*.

Charis E. Kubrin is a Professor in the departments of Criminology, Law and Society, and Sociology, at the University of California Irvine. Her research focuses on neighborhoods, race, and violence as central to social disorganization theory. Charis is co-author of *Researching Theories of Crime and Deviance* (Oxford University Press 2008) and *Privileged Places: Race, Residence, and the Structure of Opportunity* (Lynne Rienner 2006), and co-editor of *Introduction to Criminal Justice: A Sociological Perspective* (Stanford University Press 2013), *Punishing Immigrants: Policy, Politics, and Injustice* (New York University Press 2012), and *Crime and Society: Crime, 3rd Edition* (Sage Publications 2007). In addition to books, Charis' work has been published in various academic journals including *American Journal of Sociology*, *Annals of the American Academy of Political and Social Science*, *City and Community*, *Criminology*, *Criminology & Public Policy*, *Homicide Studies*, *Journal of Quantitative Criminology*, *Journal of Research in Crime and Delinquency*, *Justice Quarterly*, *Men and Masculinities*, *Social Forces*,

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Social Problems, Social Science Quarterly, Sociological Perspectives, Sociological Quarterly,
and *Urban Studies*.

From Bad to Worse: The Relationship between Changing Inequality in Nearby Areas and Local Crime

Most neighborhood crime studies focus on the effects of community-level conditions on crime within the communities where these conditions exist. For the most part, this literature has been silent about the possibility that community-to-community effects may not be bound by geographic proximity, that what occurs in neighborhoods may be affected by conditions external to them (Mears and Bhati 2006:510). For some, this is problematic as “many intervention efforts have failed because they did not adequately address the pressures toward crime in the community that derive from forces external to the community in the wider social structure” (Morenoff, Sampson, and Raudenbush 2001:552).

More recently, however, researchers are recognizing the importance of studying communities as part of a broader social context. Along these lines, researchers have examined spillover effects of violence leading, for example, to similar rates of violence among geographically contiguous communities (e.g., Morenoff, Sampson, and Raudenbush 2001; Raleigh and Galster 2014). Other researchers have considered the displacement of crime from one area to another due to an intervention targeting a specific area (e.g., Weisburd and McEwen 1998). And still other researchers have determined whether crime “hot spots” have spillover effects, with violence diffusing from these areas to geographically proximate communities (e.g., Sherman, Gartin, and Buerger 1989). These are all excellent developments in the quest to identify and model “unbounded community effects” (Mears and Bhati 2006: 511), yet this literature has not sufficiently considered whether local area social conditions, particularly racial composition and income inequality, influence violence in spatially neighboring communities.

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That is, rather than simply asking whether crime in nearby areas impacts crime in a specific neighborhood (Hipp 2007; Morenoff, Sampson, and Raudenbush 2001), we can ask whether the socio-demographic characteristics of nearby areas impact the level of crime in a neighborhood (Kubrin and Hipp 2014; Peterson and Krivo 2010).

Despite this general gap in prior scholarship, there are some notable exceptions. Recent research by Mears and Bhati (2006), Peterson and Krivo (2010), Sharkey (2014), and Griffiths (2013), for example, considers how spatial inequality plays an important role for social change in neighborhoods. In all of these studies researchers find that, in varying ways, some neighborhoods experience a significant “spatial disadvantage,” which has serious implications for their crime rates (Sharkey 2014: 909).

In the current study, we build on this growing literature by taking up recent calls to “consider the ways in which individual neighborhoods are embedded within highly stratified urban landscapes that may influence the risks and opportunities to which individuals are exposed throughout different stages of the life course” (Sharkey 2014: 937). In particular, we examine the relationship between the changing racial and income composition of the neighborhood, and nearby areas, and changes in neighborhood crime rates. The study is conducted on neighborhoods in the city of Los Angeles from 2000 to 2010. We make several innovative contributions to the literature.

Our first contribution to this literature is to move beyond the use of administrative units for defining neighborhoods and instead use egohoods, as recently introduced by Hipp and Boessen (2013). Egohoods are overlapping concentric circles that surround each block in the city. The egohood approach builds on insights from the mental mapping literature, the social networks literature, the daily activities pattern literature, and the travel to crime literature.

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Egohoods are conceptualized as waves washing across the surface of cities, as opposed to independent units with non-overlapping boundaries. These spatially overlapping units more appropriately capture the true amount of social interaction between residents of various groups.

A second innovation is that whereas the growing body of spatial neighborhood research has focused on the relationship between nearby disadvantage and neighborhood crime (primarily based on socio-economic measures but sometimes based on the share of minorities in a neighborhood), we construct and utilize measures of income distribution (inequality) *and* racial/ethnic heterogeneity. We employ these measures to assess the relationship between inequality and heterogeneity in the neighborhood, and nearby, with crime rates.

Third, a limitation of existing literature on the relationship between spatial inequality and crime is the frequent treatment of this relationship as static by employing cross-sectional analyses. We argue instead that it is necessary to explore this potentially dynamic relationship with longitudinal data to better understand how spatial inequality and crime are related. A novel contribution, therefore, is to use longitudinal data and models to explore how changes in neighborhood characteristics are associated with changing levels of crime.

Finally, an important consideration is the potential limitation of focusing on inequality solely within a neighborhood and a small surrounding area. Rather, the level of inequality in a much broader area may also have important consequences. Given evidence in the literature that higher levels of inequality in larger units such as cities impact crime in those units (e.g., Blau and Blau 1982; Messner and Golden 1992), a natural question is whether inequality at larger scales will impact crime levels in local neighborhoods. Our innovation is to explore this possibility by focusing on whether any change in inequality in a broader area surrounding an egohood is associated with the change in crime in the egohood itself.

Neighborhoods, Spatial Inequality, and Crime

Nearby Areas and Consequences for Crime

Scholars working within the social disorganization theory framework often focus exclusively on the impact of structural conditions on crime within neighborhoods. In line with this approach, neighborhoods with higher levels of economic disadvantage, residential instability, and racial/ethnic heterogeneity are posited to have more social disorganization and hence more crime. Although this research has provided considerable insights, a limitation is that it often neglects conditions in nearby areas. Given the well-documented finding that offenders travel distances to crime that frequently exceed the typical size of the “neighborhoods” used in such studies (e.g., Rossmo 2000), this approach likely overlooks an important component of the social processes generating crime in neighborhoods by failing to account for conditions in nearby areas. Fortunately, researchers are increasingly recognizing the importance of taking into account the effect of nearby areas (Mast and Wilson 2013; Mears and Bhati 2006; Popkin, Rich, Hendey, Hayes, Parilla, and Galster 2012).

Despite this recent push to consider spatial areas surrounding neighborhoods, research rarely considers the presence of spatial inequality. We define *spatial inequality* as inequality that exists *across* areas without specific boundaries. *Inequality* more generally is a concept that fundamentally refers to a specific unit, for example, the level of inequality *for* a city, a county, or a country. Alternatively, spatial inequality refers to the case where units are more difficult, or even impossible, to explicitly define. Spatial inequality, then, refers to inequality that occurs not in previously defined non-overlapping units (e.g., cities; counties) but rather across overlapping units based on some distance from a neighborhood. Although some researchers have measured

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the level of inequality in neighborhoods (Crutchfield 1989; Hipp 2007; Hipp and Yates 2011;

Messner and Tardiff 1986), the boundaries of neighborhoods themselves are quite contested and uncertain. Thus, if the scale at which the social process of inequality impacts levels of crime is not consistent with the boundaries of certain units such as neighborhoods or cities, then measuring the level of inequality contained in various subareas of a city—spatial inequality—is critical. This is generally known as the modifiable areal unit problem (Openshaw and Taylor 1979).

Only a handful of studies have begun to address the issue of how the spatial pattern of concentrated disadvantage across the landscape might be important; nonetheless, these studies have not explicitly measured *inequality*. For example, Sharkey (2014) descriptively explored the spatial patterning of economic disadvantage by the racial composition of neighborhoods. Using national data from the 1970-2000 Censuses, Sharkey (2014) integrated spatially lagged measures of neighborhood characteristics into an analysis of neighborhood inequality (measured at the census tract level) in order to produce a more comprehensive picture of the residential environments surrounding different racial and ethnic groups, including their own neighborhoods as well as the neighborhoods that border them. He noted a distinct spatial pattern in which black middle class neighborhoods were more likely to be located near poorer neighborhoods compared to white middle class neighborhoods. Although his study did not focus on the consequences of these spatial patterns for neighborhood crime rates, it did highlight the importance of such patterns.

In another set of studies, Peterson and Krivo (Peterson and Krivo 2009; Peterson and Krivo 2010) explored the spatial patterning of neighborhoods (measured as tracts) based on racial composition and concentrated disadvantage using data from the National Neighborhood

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Crime Study (NNCS). In their study of neighborhoods in 91 U.S. cities at one point in time, Peterson and Krivo (2010) evaluated whether the character of neighboring areas—reflected by levels of disadvantage, residential instability, immigration, community investments, and white residents—accounts for differentials in crime over and above differences produced by the internal character of neighborhoods. Although they did not measure inequality per se, they did find that the level of economic disadvantage in nearby areas was positively related to crime levels in the focal neighborhood. Moreover, they found that while white neighborhoods benefit from the dual privileges of low internal disadvantage and embeddedness within a context of other white and advantaged areas, African American and Latino neighborhoods suffer a double jeopardy—they are at risk of greater violence stemming from their own internal, often highly disadvantaged, character and they bear the brunt of isolation from violence-reducing structures and processes because they are surrounded by disadvantaged areas (pg. 104).

Finally, Mears and Bhati (2006) examined whether resource deprivation (measured using an index combining the percentage of families with children headed by females, percentage of the resident population below the poverty level, unemployment rate, median household income, and median family income) contributes not only to local area violence but also to violence in geographically contiguous (and to noncontiguous but socially similar) communities in Chicago. Despite their focus on the spatial and social patterning of disadvantage, they did not measure inequality. Still, Mears and Bhati find that higher resource deprivation is associated with higher homicide rates, regardless of spatial location. Collectively, these studies have pushed our thinking regarding the importance of concentrated disadvantage in nearby areas but what remains necessary is to explicitly consider the relationship between spatial *inequality* and crime—the focus of the current research.

Theoretical and Methodological Challenges

Despite the relative lack of research, there are theoretical reasons to expect that spatial inequality may have important consequences for neighborhood crime. In social disorganization theory, for example, economic differences between residents are expected to reduce social interactions and subsequent levels of informal social control (Hipp 2007; Kubrin and Weitzer 2003). In routine activities theory and its geographic expression in crime pattern theory, to the extent that the wealthy represent more attractive targets and the poor are more likely to be offenders due to limited economic resources, the close proximity of these groups (which is reflective of spatial inequality) is expected to generate more crime (Rountree and Land 1996; Smith, Frazee, and Davison 2000). Finally, relative deprivation theory posits that economic inequality entails conflict of interest over the distribution of resources, which spells a potential for violence (Blau and Blau 1982). Inequality can lead members of the disadvantaged group to feel deprived and therefore they are more likely to respond by committing crime (Agnew 1999; Messner and Golden 1992; Taylor and Covington 1988).

Despite these theoretical arguments, there is relatively little empirical support in the literature documenting this relationship. This is likely due to methodological limitations of existing research—rather than to a failing of these theories. As Hipp and Boessen (2013) explained, a feature of nearly all constructed “neighborhoods” in existing research is defining neighborhood boundaries such that they yield similarity *within* the neighborhood and generate difference *across* neighborhoods. This approach has strong implications for assessing the impact of spatial inequality; effectively, the boundaries of such neighborhoods attempt to remove all inequality *within* neighborhoods. The consequence is that studies of neighborhood inequality and

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crime often find minimal relationship given that most of the spatial inequality in the larger area has been defined away (Crutchfield 1989; Messner and Tardiff 1986).

Hipp and Boessen (2013) suggested two possible solutions. One is to explicitly model spatial inequality across units such as census tracts. This approach at least attempts to recapture some of the spatial inequality that was systematically removed through the process of defining neighborhoods. A second, and better, solution proposed and ultimately implemented by Hipp and Boessen (2013) is to use a definition of neighborhoods that does not rely on non-overlapping boundaries—an approach they termed *egohoods*. This overlapping approach considers egohoods to be centered on a block and to include some area surrounding the block to capture the activity patterns of residents. The result is that egohoods are overlapping “waves washing across the surface of cities” (Hipp and Boessen 2013: 287). An egohood takes a block as the center point and then incorporates all other blocks within a particular-sized buffer to be part of the same egohood.

It is important to highlight that egohoods are distinct from other approaches that might appear the same at first blush. For example, some research has measured levels of inequality in existing units as well as in nearby units (Raleigh and Galster 2014). However, such approaches still measure inequality based on non-overlapping units that are typically pre-defined (i.e., by the U.S. Census) and therefore treat the units as being appropriate for measuring inequality. The egohood approach differs in that it combines small discrete units (blocks) into larger units, and then computes the level of inequality in these larger, overlapping, units. Another approach that appears similar to the egohoods approach is what Hipp and Boessen (2003) referred to as the individual social environment (ISE) perspective. In the ISE approach, the focus is on how some environment measured as the buffer around a person’s residence impacts the individual. This

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approach is common in the public health literature (Brownson, Hoehner, Day, Forsyth, and Sallis 2009) and was explored recently using data in a Scandinavian context (Andersson and Musterd 2010). This approach also underlies the segregation measures developed by Reardon and colleagues (Reardon, Matthews, O'Sullivan, Lee, Firebaugh, Farrell, and Bischoff 2008). The egohoods approach differs in that it does not posit that this surrounding area *acts upon* the block at the center of the buffer as is done in the ISE approach, but rather posits that the entire buffer operates as an ecological unit of interest.

Hipp and Boessen (2013) show that employing egohoods as the unit of analysis resulted in a model that better predicted the location of crime than did a model using non-overlapping units such as tracts. Particularly notable is their finding that the relationship between inequality and crime was extremely strong in the egohoods approach, whereas it was nonexistent when using census tracts, highlighting the methodological limitation of prior research using traditional units to test this relationship. They also show that the ISE approach found essentially no such effect of inequality. Hipp and Boessen also discovered that the racial/ethnic heterogeneity-crime relationship was often stronger when employing egohoods as the unit of analysis. Indeed, heterogeneity is conceptually similar in key ways to inequality; to the extent that neighborhoods are defined based on racial homogeneity, then such neighborhoods artificially deflate the amount of racial heterogeneity that exists across the social environment. Egohoods appropriately capture this heterogeneity and therefore, are better able to detect the possible relationship with crime rates.

Although Hipp and Boessen (2013) compared results using egohoods with different sized buffers, it was beyond the scope of their study to explore whether inequality levels in the area *surrounding* the egohood were related to crime rates within the egohood, something we address

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in the current study. There are different ways to conceptualize such spatial inequality. One approach compares the average socio-economic status (SES) in the egohood to the average SES in the surrounding area, allowing one to test whether the difference in the average SES in the two locations impacts crime levels in the egohood. This approach, however, ignores the level of inequality *within* the egohood or in the surrounding area. Therefore a second approach tests whether inequality in the surrounding area impacts crime in the egohood and a variant of this approach considers whether this nearby inequality is accentuated when there are higher levels of inequality within the egohood itself.

Another important extension for exploring the spatial inequality-crime relationship is to move beyond static, cross-sectional approaches and instead to focus on *change* in neighborhoods. Given that theories such as defended neighborhoods theory (Grattet 2009; Green, Strolovitch, and Wong 1998) argue it is the change in neighborhood composition that has critical consequences for crime, cross-sectional models assuming a system in equilibrium are unable to capture such dynamic processes. Likewise, whereas relative deprivation theory (Agnew 1999; Hipp 2007; Messner and Golden 1992; Taylor and Covington 1988) focuses on how perceptions of inequality may lead to a sense of injustice and hence more crime, it may be that *changes* in inequality levels are particularly salient to residents and, therefore, may most strongly impact changes in crime levels. Longitudinal data that explicitly measure such changes are needed to assess this claim.

Beyond changes in inequality is the likely importance that changes in the racial/ethnic composition have for crime. While occasional research has explored the relationship between racial/ethnic change and neighborhood crime (Green, Strolovitch, and Wong 1998; Kubrin 2000), next to no studies have considered whether the spatial patterning of this racial change is

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consequential. In particular, it may be that racial/ethnic churning, when accompanied by increasing inequality, has a particularly pronounced relationship with changes in crime. This may occur because simultaneous changes in the racial composition as well as the economic distribution may be perceived as a strong threat to the stability of the neighborhood, resulting in more pronounced withdrawal from the neighborhood and hence lowered collective efficacy. We explore this possible interaction effect in the analyses.

Broader Spatial Patterns

Up to this point we have considered only that neighborhood inequality and inequality of nearby areas might be related to neighborhood crime levels. Yet spatial inequality may play out on a larger geographic scale with consequences for neighborhood crime. Given theories focusing on the consequences of inequality at larger scales, this is certainly a plausible suggestion.

Various theories posit why spatial inequality at a larger scale might impact levels of crime. There are two broad perspectives that we highlight. First, higher levels of inequality in a larger community reduce the level of social capital among residents, resulting in residents who are less willing to provide resources to more disadvantaged neighborhoods that would allow them to address crime problems (Putnam 1995). A consequence is that this broader scale inequality would generate higher crime levels in neighborhoods. We might also expect this spatial inequality to result in higher crime rates in lower-income neighborhoods given their inability to obtain resources to combat crime and disorder from the broader community.

A second possible mechanism is that higher levels of inequality across a broader spatial area create a sense of injustice among some residents, the result of which would be more offenders in the environment (Blau and Blau 1982). While relative deprivation theory posits that feelings of injustice can result from inequality, defining the appropriate reference group,

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especially geographically, is particularly challenging (Hipp 2007). It may be that the level of inequality within a neighborhood, or nearby, is not the proper scale at which such feelings of injustice are engendered if residents take into account inequality at a larger spatial scale. If such perceived injustice indeed creates more offenders, and offenders have specific spatial patterns in where they offend as evidenced in the journey to crime literature (Rossmo 2000), then we would expect to see higher levels of crime in egohoods. That is, residents may perceive this spatial inequality as structural inequality that reduces their own opportunities and therefore, be less willing to pursue educational opportunities that could enable employment in high quality mainstream jobs. To the extent that a lack of quality employment changes the calculus of residents in choosing between employment in the mainstream economy and crime (Bushway 2011), this would indeed result in more offenders.

Notably, nearly all studies exploring inequality at larger scales also have measured crime rates at similarly large geographic scales (e.g., Blau and Blau 1982; Harer and Steffensmeier 1992; Messner and Golden 1992). Thus, researchers have typically failed to explore whether inequality at a larger scale has consequences for crime levels in certain types of neighborhoods *within* the larger area. We might expect, for example, that the most vulnerable areas—those that are more structurally disadvantaged and socially disorganized—are more likely to be negatively impacted by greater inequality in the broader spatial area around them, in large part because these areas lack the internal dynamics to combat crime. This implies an interaction effect, which we assess in the analyses.

Another limitation of this literature is that studies typically utilize units of analysis that are politically determined (e.g., cities, counties, etc.). In relatively dense urban areas, it is questionable whether city boundaries provide a substantively important break in the social

environment between cities (for a more complete discussion of this issue, see Hipp and Roussell 2013). If, in fact, social interactions among residents—as well as offenders—transgress city boundaries, then analyses that assume these boundaries capture substantively important units may impose incorrect assumptions. This issue is similar to the earlier discussion of the problem with defining neighborhoods. One solution is consistent with the egohoods approach and utilizes boundaries around various neighborhood units, but utilizing a much larger-sized buffer (Hipp and Roussell 2013). While Hipp and Roussell (2013) suggested drawing large-scale buffers around each neighborhood in a community, they lacked the fine grained crime data that we employ in this study to explore whether this larger-scale spatial inequality is related to crime in the local neighborhood.

It also may be the case that *changes* in the level of spatial inequality in the broader area have important consequences. As inequality increases at the larger spatial scale, the impact this has on residents' perceptions may be particularly strong, reducing their sense of social capital as well as their sense of “being in it together.” Despite these theoretical possibilities, we are aware of no studies that have explored this question.

Before turning to a description of our data and methods, we consider a complication—that crime itself can play a role in neighborhood change. This can occur because crime 1) induces residential mobility in general, 2) induces disproportionate residential mobility by higher income residents, and 3) induces disproportionate residential mobility by white residents. Regarding general mobility, there is a burgeoning literature showing that crime can lead to residential mobility (Dugan 1999; Xie and McDowall 2008). Neighborhood studies have also detected this pattern, as census tracts in Chicago with high numbers of homicides experienced population losses over time (Morenoff, Sampson, and Raudenbush 2001), and a study of

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neighborhoods across 13 cities found that higher levels of crime led to population loss and increased vacancies ten years later (Hipp 2010a). Regarding disproportionate mobility based on economic resources, studies have found that crime in neighborhoods can lead to disproportionate mobility based on economic resources, which will lead to lower average income and lower home values in these neighborhoods. For example, studies have found that neighborhoods with higher rates of crime have lower home values (e.g., Buck and Hakim 1989; Schwartz, Susin, and Voicu 2003; Thaler 1978), and that neighborhoods experiencing increasing levels of crime also experience decreasing relative home values (Hipp, Tita, and Greenbaum 2009; Tita, Petras, and Greenbaum 2006). And there is evidence of disproportionate mobility by race/ethnicity of residents. To the extent that racial/ethnic minorities have limited access to certain neighborhoods, they may be less able to leave a neighborhood with more crime and more likely to enter a neighborhood with higher crime levels. For example, there is evidence that black homeowners are more likely to enter more disadvantaged neighborhoods. Independent of their socioeconomic resources (Deng, Ross, and Wachter 2003). And studies have found that such disproportionate mobility by minorities is related to victimization experiences for residents on a block (Xie and McDowall 2010), the perception of crime among residents on a block (Hipp 2010b), and levels of violence in the broader neighborhood (Hipp 2011). Longitudinal studies of neighborhoods in Chicago found higher delinquency rates were associated with more non-whites at the next time point (Bursik 1986), and that increasing homicide rates were associated with more black residents ten years later (Morenoff and Sampson 1997). Finally, a study of neighborhoods across 13 cities likewise found that higher levels of violence were associated with higher proportions of African Americans ten years later (Hipp 2010a). This literature suggests that certain neighborhood structural characteristics may be endogenous to crime. Specifically,

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residential instability, poverty, and the presence of racial/ethnic minorities are all potentially affected by levels of neighborhood crime.

Yet we argue that the pattern is more complicated when considering distributional measures such as economic inequality and racial/ethnic heterogeneity. If anything, we would expect these measures to *decrease* in neighborhoods with more crime. That is, if higher income residents are more likely to leave a neighborhood due to higher crime rates, then the neighborhood will not only become poorer over time but will have lower levels of inequality (given that mostly low income residents remain in the neighborhood). And the logic is the same for racial/ethnic heterogeneity: to the extent that white households are disproportionately leaving a neighborhood, it will transition into a neighborhood with a higher proportion of racial/ethnic minorities but a *lower* level of racial/ethnic heterogeneity. Given that our analytic technique is descriptive, we do not attempt to disentangle these relationships by using instrumental variables. We merely raise these points to highlight the fact that we are particularly unlikely to detect a positive relationship between the change in inequality in a neighborhood and the change in crime given these previously observed mobility patterns. Furthermore, it is particularly difficult to predict how crime in local neighborhoods might systematically affect the level of inequality in broader area. Nonetheless, our analytic strategy is one simply trying to describe these patterns.

Data and methods

Our study area is the city of Los Angeles, an ideal location given levels of racial and ethnic heterogeneity and large disparities in income levels. This study site allows us to explore the patterns of spatial inequality in a city whose sprawling suburban growth is representative of newer Sunbelt cities that have blossomed since the end of World War II in the United States.

Data

Crime data come from the Los Angeles city police department. The dependent variables are created from crime reports officially coded and reported by the police department. We classified crime events into five Uniform Crime Report (UCR) crime types: aggravated assault, robbery, burglary, motor vehicle theft, and larceny. We averaged these measures over three years at the beginning (2000-02) and the end (2009-11) of the time period to minimize yearly fluctuations. Given that we know the actual location of all crime events, we were able to aggregate this information into egohoods. We do not compute these measures as crime rates, as this would generate missing values for observations with no population. We instead residualize these results by directly including population in the models.

Unit of Analysis: Egohoods, and Surrounding Area

The notion of egohoods was first introduced by Hipp and Boessen (2013). The approach begins by identifying each block in the city and drawing a buffer around each individual block. This buffer represents the egohood for a particular block and includes all blocks whose centroids are contained in this buffer. Thus, whereas the Census uses tracts, block groups, and blocks—all of which are based on a common population size—egohoods are based on a common area size. For this study, we utilized a buffer of $\frac{1}{4}$ mile given Hipp and Boessen's finding that this sized egohood often revealed a relatively stronger relationship with crime compared to larger buffers. We will, however, also take into account the area surrounding the egohood, as described shortly. For variables that the Census aggregates to blocks, it is straightforward to sum all of the blocks within an egohood to compute the measures. There are 29,157 egohoods in the city of Los Angeles, one for each block in the city.

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A novel contribution of the present study is not only to compute egohoods, but also to compute information on the area *surrounding* these egohoods. Conceptually, these areas can be thought of as donuts; whereas the egohood captures a particular sized area around a block ($\frac{1}{4}$ mile buffers in this study), we also measured the next quarter mile radius around the egohood as a spatial area of interest (the donut).

Constructing the Measures

The covariates in the models come from data collected by the 2000 U.S. Census, the 2007-11 American Community Survey (ACS) five-year estimates, and the Southern California Association of Governments (SCAG), which contains land use data. We aggregated the data to egohoods at the beginning and end time points, and then computed difference variables for all variables described in this section.

We capture change in the economic environment of the egohood with two different measures: *average household income* and *household income inequality*. To construct the average income measure, at each time point we first assigned household incomes to the midpoint of their reported range (the Census only reports household incomes in particular ranges), and then computed the average income for residents from this information.¹ We then computed the difference in this measure over the two time points. Household income inequality is measured as the standard deviation of the logged household income. We computed the midpoints of the income bins, log transformed these values, multiplied them by the number of observations in each bin, computed the mean logged household income, and then computed the standard deviation of income based on these values. We then computed the difference in this measure at the two time points.

¹ For the highest range, we assigned the value as being 25% greater than the bottom value in this range.

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A challenge for constructing the inequality measures is that the Census data regarding income is aggregated to block groups. Whereas Hipp and Boessen (2013) used a population-weighted approach to apportion such data to blocks, we utilized a more principled imputation approach for our inequality measures. Our approach exploits the fact that the Census provides information on the income distribution *by racial/ethnic group* in each block group and provides information on the composition of racial/ethnic groups in each *block*. To get the representation (R) of group g of G groups in a particular block, we computed the proportion of group members in the block group that live in a particular block:

$$(1) R_g = g_b / g_g$$

where g_b is the population of group g in the block (b) of 1 to G groups and g_g is the population of group g in the block group (g). To obtain an estimate of the number of persons for an income category (IC) in the block (b) in a particular income category q of Q categories provided by the Census for group A, we multiplied the number of persons in a bin for the block group (g) by the group representation (R) in the block:

$$(2) IC_{qb} = IC_{qg} * R_g$$

After computing equation 2 for each of the G groups, we generated estimates of the number of persons in each income category for each of the groups in the blocks. These can be used to aggregate the information of all blocks in the egohood and then to compute inequality measures by racial group. We use this information for each of the separate groups and sum them together within each block, and then sum them over all the blocks in the egohood to compute the overall level of inequality in the egohood (as the standard deviation).

To capture the possible disruptive effects of a lack of oversight from single parent households, we constructed a measure of the change in the *percentage of single parent*

households. Although researchers often combine this measure into a scale of concentrated disadvantage that might include average income, we keep these two measures separate in order to assess their independent relationship with changing crime rates. The correlation between these measures for our change variables is not as high as for cross-sectional measures, as these change variables are correlated at -.60 in egohoods and -.68 in the surrounding area. With our large sample, we are able to empirically distinguish between these two relationships.

We measured the changing racial/ethnic composition of the egohood using three approaches: 1) measures of the percentage in various racial/ethnic categories; 2) a measure of racial/ethnic heterogeneity; and 3) a measure of racial/ethnic churning (Pastor, Sadd, and Hipp 2001). The change in the racial/ethnic composition is captured by measures of the change in the percentage African American, Latino, and Asian (with percentage white and other race as the reference category). We measured racial/ethnic heterogeneity with the Herfindahl index of the same five racial/ethnic groups at each time point, and then computed the difference over the two time points. We measured ethnic churning (EC) of the same five groups as:

$$(3) \quad EC_k = \sqrt{\sum_1^J (G_{jt} - G_{jt-1})^2}$$

where G represents the proportion of the population of ethnic group j out of J ethnic groups at time t (2010) and time $t-1$ (2000) in egohood k . This yields a measure of the degree of racial/ethnic transformation that occurred in the tract during the decade (this is a sum of squares of differences and we take the square root to return it approximately to the original metric) (Hipp and Lakon 2010). If there is no change in the racial/ethnic composition, it will have a value of zero.

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Note that these measures are conceptually different in how they represent change in the racial/ethnic composition of an egohood. The parameters for the composition measures are capturing the change in crime given a change in the composition of a particular group; thus, the coefficient for the change in percentage black shows the change in crime when a neighborhood experiences an increase in the percentage black and an equal decrease in the percentage white or other race (given that this is the reference category). This parameterization implies that a similar increase in the percentage *white or other race* along with a decrease in the percentage black will have an *opposite* relationship with the crime rate. As such, it presumes that there is something about the specific group moving in that will be related to the crime rate. In contrast, the *ethnic churning* measure posits that *any* change in the racial/ethnic composition of an egohood will have an equal relationship with the change in crime. Thus, for example, a neighborhood that experiences a 10 percentage point increase in any group will experience the same change in crime regardless of which group is moving in. This implies that there is something about change in the racial composition in and of itself that is related to crime rates; indeed, such churning may reduce collective efficacy and therefore result in more crime (Sampson, Raudenbush, and Earls 1997). Finally, the parameter for the change in racial/ethnic heterogeneity implies that change in the racial/ethnic composition will have a distinctly different relationship with crime when heterogeneity is increasing in the egohood compared to when heterogeneity is decreasing. For example, a 10 percentage point increase in blacks in a neighborhood that is 30% black and 70% white will result in an increase in the level of heterogeneity but the same 10 percentage point increase in blacks in a neighborhood that is 70% black and 30% white will result in a *decrease* in the level of heterogeneity. This parameterization tests whether these types of change have differential associations with the change in crime.

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To minimize the possibility of obtaining spurious results, we include several additional measures that may be related to the change in crime in egohoods. Given prior work which suggests that home owners are more willing to provide social control capability, we include a measure of the change in the percentage owners in the egohood. There is evidence that vacant units can be crime generators (Kubrin and Hipp 2014; Rice and Smith 2002; Smith, Frazee, and Davison 2000) and we therefore construct a measure of the change in the percentage vacant units. Life course literature suggests that the ages 16 to 29 are the prime ages of offenders. We therefore construct a measure of the change in the percentage aged 16 to 29 in the egohood. To capture the presence of nearby persons, we include a measure of the change in population in the egohood (given the constant areal size of egohoods, this is effectively a measure of population density).

As certain land use types can be crime generators (Kubrin and Hipp 2014; Stucky and Ottensmann 2009), we constructed measures of the change in the percentage of land area that is composed of six types of land use: 1) office; 2) industrial; 3) retail; 4) residential; 5) vacant lots; and 6) other land uses (e.g., parking lots, parks, cemeteries, etc.).

We also constructed similar measures for the $\frac{1}{4}$ mile area surrounding each egohood. This was accomplished by computing similar measures in $\frac{1}{2}$ mile egohoods and then subtracting out the $\frac{1}{4}$ mile egohood values to get the measure of this surrounding area. Finally, we computed measures of the socioeconomic status of the broader area by computing the average income and inequality in a 2.5 mile egohood of the block. This broader area captures a much larger context. For example, whereas the average population for a $\frac{1}{4}$ mile egohood in the study area is 2,130 persons and is 8,814 persons for a $\frac{1}{2}$ mile egohood, it is just under 200,000 persons for a 2.5 mile

statistics for the variables used in the analyses are presented in Table 1.

<<<Table 1 about here>>>

Methods

The outcome measures represent the change in the number of crime events between the first and last time points. Given that they can have negative values, it is not feasible to estimate the models as negative binomial regression models. We instead estimate linear regression models. The first set of models includes the main effects of our variables of interest. The second set of models assesses whether the relationships between changing inequality and changing crime rates are moderated by certain characteristics. We examined several moderating relationships. First, we created a multiplicative measure of inequality in the egohood and inequality in the surrounding area to determine whether this spatial patterning moderates the results. Second, we assessed whether changing inequality and racial/ethnic heterogeneity operate in tandem by constructing multiplicative measures of inequality and racial/ethnic heterogeneity in the egohood, and in the surrounding ¼ mile. Third, we examined whether the relationship of the change in inequality in the egohood or surrounding area is moderated by the level of inequality in the broader 2.5 mile egohood by constructing multiplicative interactions. Finally, we examined whether the level of inequality is most strongly associated with income egohoods by constructing a multiplicative interaction. By constructing difference variables, our fixed effects models eliminate the influence of time-invariant unobserved characteristics of blocks and

² We do not subtract out the characteristics of the ½ mile buffer within this larger 2.5 mile buffer, given that it is a relatively small proportion of the total area. Indeed, the ½ mile buffer constitutes less than 5% of the 2.5 mile buffer.

egohoods. They do not, however, remove the possibility of endogeneity. For this reason, we treat these results as descriptive of these inequality patterns.

Results

The models assess the relationship between the change in our inequality measures and the change in crime over the decade. Turning first to the relationship with changing average income, we detect a relatively strong relationship in the egohood but an even stronger relationship for the surrounding buffer (see Table 2). Egohoods experiencing an increase in average household income simultaneously experience decreases in aggravated assaults, robberies, and burglaries over the decade, controlling for the other measures in the models. A one standard deviation increase in average household income is associated with between .027 and .042 standard deviation decreases in these crime types. Note that this could alternatively be reflective of a feedback effect of crime onto the level of income in the neighborhood. There is also a spatial pattern, as egohoods surrounded by areas with falling average household incomes also experience an increase in all crime types during the decade. This is a strong relationship, and much stronger than that of income change within the egohood itself, as a one standard deviation increase in average income in the surrounding area is associated with anywhere between .095 standard deviation fewer motor vehicle thefts to .29 standard deviation fewer robberies. Note that there is an additional relationship with the increasing presence of single parent households, even after accounting for the change in the average income, as egohoods experiencing an increase in single parent households also experience sharp increases for all crime types during the decade (between .06 and .137 standard deviations). There is an additional spatial pattern, as egohoods experiencing an increase in single parent households in the surrounding area experience sharp

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increases in aggravated assaults and motor vehicle thefts as well as an increase in the other crime types.

<<<Table 2 about here>>>

The relationship between increasing inequality in the egohood and crime rates is modest. Egohoods with increasing inequality experience significantly decreasing robbery and larceny rates during the decade, holding constant the other measures in the models. Furthermore, increasing inequality in the surrounding area has a negative relationship with these crime types, which is opposite expectations.

It is notable that whereas there is no evidence that the level of inequality in the egohood or surrounding ¼ mile is associated with higher levels of crime in an egohood, the economic conditions of the even broader 2.5 mile surrounding area have a quite strong association. An egohood in which there is a one standard deviation increase in inequality in the surrounding 2.5 mile area is associated with anywhere from a .046 standard deviation increase in burglaries to a .174 standard deviation increase in aggravated assaults. Likewise, an egohood with a one standard deviation increase in average income in the surrounding 2.5 mile area will experience, on average, anywhere from .062 standard deviation fewer robberies to .131 standard deviation fewer motor vehicle thefts. These are very strong associations, suggesting that it is imperative to account for this broader context.

The findings also reveal that changes in the racial/ethnic composition of the egohood are related to changes in the crime rate. However, the pattern differs across the crime types and across the different measures of racial change. For example, the relationship with ethnic churning is quite strong for aggravated assaults, even after controlling for changes in specific groups or changes in the level of racial/ethnic heterogeneity. A one standard deviation increase

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in ethnic churning in an egohood is associated with a .111 standard deviation increase in aggravated assaults, a .02 standard deviation increase in robberies, and a .03 standard deviation increase in motor vehicle thefts. Yet such neighborhoods also experience a .02 standard deviation decrease in larcenies, holding constant the other measures. The actual change in the racial/ethnic composition matters: neighborhoods that experience an increase in percentage black and a simultaneous decrease in percentage white or other race are more likely to experience an increase in violent crime but a decrease in property crime. Again, this relationship with violence could also be reflective of disproportionate mobility out of the neighborhood by white residents. And neighborhoods that experience an increase in percentage Latino and a simultaneous decrease in percentage white or other race are more likely to experience increases in robberies, burglaries, and larcenies, which may also reflect, at least to some extent, disproportionate mobility. Finally, a neighborhood experiencing a one standard deviation increase in racial/ethnic heterogeneity experiences, on average, a .037 standard deviation increase in aggravated assault and .024 standard deviation increase in larcenies. It is hard to explain this relationship in terms of disproportionate mobility given that prior evidence would imply that higher levels of crime would *reduce* levels of heterogeneity.

The change in the racial/ethnic composition of the surrounding area also appears related to crime levels. On the one hand, increasing ethnic churning in the surrounding area is associated with modest increases in aggravated assaults, but *decreases* in larcenies (and no change in the other crime types). On the other hand, increasing racial/ethnic *heterogeneity* in the surrounding area is associated with greater increases in all crime types in the egohood. A one standard deviation increase in nearby racial/ethnic heterogeneity is associated with anywhere from a .034 standard deviation increase in robberies to a .073 standard deviation increase in aggravated

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assaults. Changes in the actual composition of the racial groups nearby have differential relationships: whereas increases in the percentage Latino nearby (compared to percentage white and other) are associated with greater increases in three of the crime types, increases in the percentage Asian nearby (compared to percentage white and other) are actually associated with greater *decreases* in all crime types. Likewise, increases in percentage black nearby (compared to percentage white and other) are associated with greater decreases in all crime types (except aggravated assault), controlling for the other measures in the models.

Moderating Relationships with Inequality

We next explored whether the relationship between changes in inequality and crime rates in an egohood is moderated by the characteristics of the surrounding 1/4 mile area. The results for the models that include these interactions are shown in Table 3. We find that the relationship between increasing inequality in the egohood and crime rates is attenuated when there are greater increases in inequality in the nearby area for robberies and larcenies. Figure 1 plots this relationship for changes in the robbery rate for egohoods with low, average, and high changes in inequality in the egohood or the nearby area (one standard deviation below the mean, the mean, and one standard deviation above the mean, respectively). Egohoods with greater decreases in nearby inequality have the largest increases in robbery rates, as evidenced by the top line in this figure. Moreover, these egohoods will experience an even larger increase in robberies if they themselves are experiencing increasing inequality. In contrast, an egohood experiencing increasing inequality but that is surrounded by areas with increasing inequality is more likely to experience decreases in robberies (as shown in the bottom line in this figure). The plot for the larceny model looked similar (not shown).

<<<Table 3 about here>>>

<<<Figure 1 about here>>>

When plotting the interactions between individual egohoods and the greater area (2.5 miles), we find that the broader context has a much stronger relationship with changes in crime rates than does the nearby context. For example, Figure 2 demonstrates that the positive relationship with increasing inequality in the surrounding 2.5 miles dwarfs the relationship of changing inequality in the egohood itself (i.e., the gap between the lines is much greater than is the difference in the steepness of the slopes). Nonetheless, when egohoods experience an increase in inequality, aggravated assault increases more, on average, when inequality is increasing in the surrounding 2.5 mile area. The pattern is similar when plotting the relationship for robberies or burglaries (not shown).

<<<Figure 2 about here>>>

Finally, we assessed whether changing inequality has different associations with crime rates when it is accompanied by changing racial/ethnic heterogeneity. We found consistent evidence that all crime types increase more in egohoods that are simultaneously experiencing larger increases in inequality and racial/ethnic heterogeneity. For example, Figure 3 illustrates that whereas the relationship between increasing racial/ethnic heterogeneity in the egohood and burglary rates is relatively flat in egohoods experiencing decreasing inequality, egohoods that are simultaneously experiencing increases in racial/ethnic heterogeneity and inequality experience the sharpest increases in burglary. The pattern for motor vehicle theft was very similar (not shown). In the aggravated assault model, Figure 4 shows that the largest increases were also found in egohoods experiencing a simultaneous increase in inequality and racial/ethnic heterogeneity, but egohoods experiencing increasing inequality simultaneously with *decreasing*

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racial/ethnic heterogeneity experienced the largest decreases in aggravated assault. The pattern for larceny, and to a lesser extent robbery, looked similar (not shown).

<<<Figures 3 and 4 about here>>>

Finally, we assessed whether it is low income egohoods within areas of increasing spatial inequality that experience the largest crime increases. The detected pattern was the opposite: it is egohoods with increasing average household income that experience the largest increases when they are experiencing larger increases in inequality in the surrounding 2.5 miles. This relationship was robust for all crime types except motor vehicle theft. The plot for aggravated assault is shown in Figure 5 and demonstrates that whereas aggravated assault is highest in egohoods surrounded by increasing spatial inequality (the top line in the graph), it is higher if the egohood is experiencing *increasing* income (the right side) rather than decreasing income (the left side). The pattern was similar for robbery, burglary, and larceny (not shown).

<<<Figure 5 about here>>>

Conclusion

We have explored the relationship between spatial inequality and neighborhood crime rates by utilizing several innovations to the literature. The present study has emphasized the importance of considering the spatial distribution of inequality rather than focusing only on inequality *within* specific geographic units. We have also taken a longitudinal approach by explicitly examining the change in Los Angeles neighborhoods over a ten year period. By using the spatially overlapping approach of egohoods to measure “neighborhoods,” an innovation is that we found that changing levels of inequality in the broader 2.5 mile area are related to increasing levels of nearly all crime types in the egohood. Thus, we have found that it is

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important to conceptualize spatial inequality on various spatial scales. We next summarize the key findings.

We found that racial/ethnic change in the egohood, and the surrounding area, had a strong association with how crime changed in the egohood. We explored racial/ethnic change using three approaches: change for specific groups, change of any type, and change that increases heterogeneity. The most robust relationships were found for changing heterogeneity, as egohoods that experienced increasing racial/ethnic heterogeneity in them, or in the surrounding area, experienced consistent increases in crime over the decade. An important implication of this pattern is that it is less likely that crime could actually induce racial/ethnic heterogeneity.

Whereas existing literature has shown that crime can, at least to some extent, increase the racial minority composition of a neighborhood, there is no reason to expect it to increase heterogeneity. In fact, heterogeneity will increase in the earliest stages of in-movement of a group but will decrease in the latter stages. Thus, our modeling strategy captured general racial turnover (churning) and increases of specific groups, and these showed weaker associations with changes in crime. Instead, it was the change in heterogeneity that was most strongly related to increases in crime, which is consistent with social disorganization theory (Sampson and Groves 1989).

Another key finding was that egohoods with greater increases in inequality experienced larger increases in crime when that change was accompanied by increasing racial/ethnic heterogeneity. The results here suggest a dynamic process in which increasing levels of spatial inequality and racial/ethnic heterogeneity in the egohood are associated with increases in all crime types. Although we posited that increasing inequality in the area immediately surrounding an egohood would be associated with increased crime, this was not the case. Whereas egohoods in which the immediate surrounding area was undergoing *decreasing* inequality experienced

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greater increases in robbery and larceny, this relationship was particularly pronounced if the level of inequality in the egohood itself was increasing. Thus, we found no evidence that increasing nearby inequality was associated with increased levels of crime, at least when measuring “nearby” relatively proximately.

A particularly important finding of the present study, however, is that changing spatial inequality in a *broad* area (2.5 miles around the egohood) demonstrated a notable relationship with the change in the level of crime in the egohood—something that prior scholarship has not explored. We found that increasing levels of inequality in a 2.5 mile area surrounding an egohood was associated with increasing crime levels, even when accounting for the change in the level of inequality in the egohood itself as well as the ¼ mile buffer around the egohood. Whereas prior research has assessed the relationship between levels of inequality and crime as measured in larger units such as cities or counties, studies have not assessed whether this inequality has consequences for specific neighborhoods within these larger units. The evidence here suggests that *even within a particular city*, the change in the level of inequality in such broader areas is associated with higher crime rates in specific egohoods within that city.

It is important to note that prior research has rarely considered the possible role of spatial inequality in the macro context for higher levels of crime in the micro context. While existing neighborhood-level theories can possibly account for the relationship of inequality at a smaller scale through offender behavior as posited by opportunity theories, or reduced social interaction as posited by social disorganization theory, these theories are unable to account for the relationship we detected for macro spatial inequality and crime. We identified two theories that posit mechanisms by which inequality at the larger macro context would impact crime. In the first, Putnam has suggested that higher levels of inequality in the larger community reduce the

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level of social capital among residents and as a consequence, residents are less willing to provide resources to more disadvantaged neighborhoods that would allow them to address crime problems (Putnam 1995). However, for these larger areas with increasing spatial inequality, egohoods with *greater* increases in income had larger crime increases than egohoods with lower increases in income, in direct contrast to this prediction. This result would be consistent with a relative deprivation argument (Merton 1968) or a crime opportunity argument (Brantingham and Brantingham 1984), as neighborhoods with increasing income surrounded by inequality in the broader area might be particularly attractive targets. Future research would need to explore the possible mechanisms to determine why this pattern is observed.

A second possibility we discussed is that higher levels of inequality can create a sense of injustice among some residents and result in more offenders in the environment (Blau and Blau 1982). This increase in offenders combined with their spatial patterns as discussed in the journey to crime literature (Rossmo 2000), implies that we would expect to see higher levels of crime in egohoods. This is precisely what was observed here. The fact that higher levels of crime were observed in egohoods with increasing income that were surrounded by increasing spatial inequality may indicate that such neighborhoods are more attractive targets. These results highlight the challenge of understanding the relationship of spatial inequality for various processes: spatial inequality at larger scales may result in consequences for units of much smaller scale within these larger units. We have posited that residents who perceive more spatial inequality may view this as structural inequality that reduces their own opportunities. If this is the case, such spatial inequality may reduce the perceived effectiveness of pursuing educational opportunities that can enable employment in high quality mainstream jobs. One consequence of this is that researchers might detect that broader spatial inequality will impact educational

achievement of adolescents beyond any “neighborhood effects.” We are unable to say what mechanisms were at work in the present study, and these should be explored in future research.

Although this study has provided novel insights by exploring questions using an innovative approach, we nonetheless acknowledge some limitations. First, we were constrained to data from a single city. Whereas other research has similarly been limited to exploring processes within a single city, one nonetheless must be cautious in generalizing these results too broadly. Second, we have explored the relationships of changes in spatial inequality for particular spatial scales, which are necessarily chosen somewhat arbitrarily. We thus cannot be certain that these are the proper geographic scales for capturing spatial inequality processes, and future work no doubt should explore other spatial scales. Third, as just noted, we have not explored the possible mechanisms that might explain these relationships, leaving us in the dark about *why* such relationships exist. That task, too, is left for future researchers.

In conclusion, this study has extended the literature on the relationship between spatial inequality and crime. The fact that we found such a robust relationship between the change in the level of inequality in the broader 2.5 mile area and the change in crime in the egohood itself is a strong indicator that researchers need to carefully explore such spatial processes. And while a body of literature in criminology explores the relationship between structural characteristics and crime in smaller geographic units, finding notable relationships (e.g., Weisburd, Groff, and Yang 2012), the present results emphasize that much broader geographic scales cannot be ignored. While the characteristics of a 2.5 mile buffer with nearly 200,000 people might, at first glance, appear far too distal to be related to crime in a ¼ mile egohood, findings from this study reveal that how inequality changes in this broader context in fact is quite notably related to the change in local crime.

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Spatial Inequality and Crime
Tables and Figures

Table 1. Summary statistics of variables used in analyses. All variables capture change from 2000 to 2010

<i>Crime in egohood</i>	Mean	SD	Mean	SD
Aggravated assault	-37.04	46.73		
Robbery	-7.34	19.18		
Burglary	-10.66	21.26		
Motor vehicle theft	-16.69	24.60		
Larceny	-60.13	96.97		
<i>Demographics</i>	<i>Egohood</i>		<i>Surrounding area</i>	
Income Inequality	-0.01	0.14	-0.01	0.10
Average household income	0.25	0.37	0.27	0.25
Racial/ethnic heterogeneity	0.01	0.08	0.01	0.06
Ethnic churning	0.13	0.11	0.11	0.08
Percent black	-1.42	5.46	-1.52	4.03
Percent Asian	0.91	4.82	1.05	2.74
Percent Latino	2.51	8.66	2.38	6.32
Percent vacant units	1.60	5.71	1.74	3.53
Percent owners	-0.58	8.52	-0.51	5.56
Percent single parent households	-3.75	4.44	-4.03	3.75
Percent aged 16 to 29	0.42	5.00	0.26	2.91
Population	-0.08	0.92	129.98	919.66
<i>Land use</i>				
Percent office land use	0.03	0.07		
Percent industrial land use	-0.01	0.08		
Percent retail land use	0.04	0.10		
Percent residential land use	-0.23	0.25		
Percent vacant lots	-0.01	0.06		

Spatial Inequality and Crime

Change in surrounding 2.5 mile area

Average income in surrounding 2.5 miles	0.29	0.06
Inequality in surrounding 2.5 miles	-0.01	0.03

Note: Variables measured in 1/4 mile egohoods, and surrounding 1/4 mile. All measures capture change from 2000 to 2010

Spatial Inequality and Crime

Table 2. Models predicting change in crime from 2000 to 2010

<i>Change in egohood</i>	Aggravated assault	Robbery	Burglary	Motor vehicle theft	Larceny
Income Inequality	-1.727	-2.0269 *	0.529	-0.3744	-10.762 **
	-0.9	-2.22	0.52	-0.33	-2.66
Average household income	-5.3143 **	-1.6426 **	-1.5822 **	-0.4878	-2.4146
	-6.22	-4.03	-3.53	-0.97	-1.34
Ethnic churning	48.7338 **	3.6324 **	-1.2155	7.0134 **	-19.221 **
	18.2	2.85	-0.86	4.45	-3.41
Racial/ethnic heterogeneity	21.1866 **	1.6426	1.2246	0.7025	28.586 **
	5.79	0.94	0.64	0.33	3.71
Percent black	0.5178 **	0.0882 **	-0.1069 **	-0.2733 **	-0.3483 *
	7.8	2.79	-3.07	-6.99	-2.49
Percent Asian	-0.4172 **	0.1176 **	0.0759 *	-0.0748 *	0.8814 **
	-6.92	4.09	2.4	-2.11	6.94
Percent Latino	-0.1094 **	0.094 **	0.0905 **	0.0151	0.8703 **
	-2.81	5.07	4.43	0.66	10.62
Percent vacant units	0.1475 **	0.0368 †	0.0537 *	-0.2131 **	-0.0581
	3.52	1.84	2.44	-8.64	-0.66
Percent owners	0.166 **	-0.0169	-0.0093	-0.0148	-0.0196
	6.03	-1.29	-0.64	-0.91	-0.34
Percent single parent households	1.4449 **	0.2892 **	0.2875 **	0.5845 **	1.3074 **
	23.7	9.96	8.98	16.29	10.19
Percent aged 16 to 29	0.0385	-0.1677 **	-0.0021	0.1112 **	-1.4748 **
	0.77	-7.06	-0.08	3.79	-14.05
Population	-0.1872	-0.189	-0.5672 **	0.0934	-4.066 **
	-0.67	-1.42	-3.86	0.57	-6.89

Spatial Inequality and Crime

<i>Change in surrounding area</i>														
Income Inequality	-7.3686 *			-27.626 **			-11.269 **			-3.9366 *			-79.234 **	
	-2.23			-17.55			-6.49			-2.02			-11.39	
Average household income	-24.007 **			-21.852 **			-11.443 **			-9.2061 **			-74.521 **	
	-11.51			-21.99			-10.44			-7.49			-16.96	
Ethnic churning	14.311 **			2.8835			-0.1141			0.3097			-70.385 **	
	2.94			1.24			-0.04			0.11			-6.87	
Racial/ethnic heterogeneity	52.7358 **			10.2722 **			23.5257 **			23.1366 **			87.831 **	
	10.49			4.29			8.91			7.82			8.3	
Percent black	1.2583 **			-0.2155 **			-0.4967 **			-0.7538 **			-1.0095 **	
	13.09			-4.71			-9.84			-13.32			-4.99	
Percent Asian	-1.7226 **			-0.1766 **			-0.4532 **			-1.2743 **			-1.5517 **	
	-16.52			-3.56			-8.28			-20.76			-7.07	
Percent Latino	-0.03			0.227 **			0.3609 **			-0.0341			2.0017 **	
	-0.5			7.95			11.47			-0.97			15.86	
Percent vacant units	0.3049 **			-0.3347 **			-0.0237			-0.7551 **			-1.4952 **	
	3.96			-9.12			-0.59			-16.65			-9.22	
Percent owners	0.2609 **			-0.1353 **			-0.1346 **			0.1399 **			-0.7203 **	
	5.61			-6.11			-5.51			5.11			-7.36	
Percent single parent households	1.4801 **			0.0903 *			0.1372 **			1.166 **			1.8981 **	
	16.66			2.13			2.94			22.28			10.14	
Percent aged 16 to 29	-0.2898 **			-0.5461 **			0.0537			-0.0944 †			-1.7571 **	
	-3.11			-12.31			1.1			-1.72			-8.96	
Population	-0.002 **			-0.0021 **			-0.0028 **			0.0012 **			-0.0134 **	
	-7.75			-16.72			-20.46			7.87			-24.27	

Spatial Inequality and Crime

Change in land use in egohood												
Percent office land use	-11.531	**		2.3166		-15.565	**	-38.826	**		-100	**
	-3.47			1.46		-8.92		-19.84			-14.82	
Percent industrial land use	-40.167	**		-15.546	**	-17.858	**	-14.617	**		-99.697	**
	-14.29			-11.61		-12.1		-8.83			-16.84	
Percent retail land use	-47.429	**		-30.327	**	-30.425	**	-27.565	**		-170	**
	-21.24			-28.52		-25.95		-20.97			-35.2	
Percent residential land use	-36.636	**		-3.0648	**	-9.468	**	5.9359	**		-54.025	**
	-34.53			-6.06		-16.99		9.5			-24.18	
Percent vacant lots	-28.765	**		-6.6386	**	-7.6593	**	-15.325	**		-69.341	**
	-8.11			-3.93		-4.11		-7.34			-9.29	
Change in broader 2.5 area												
Average income in surrounding 2.5 miles	-58.228	**		-19.76	**	-33.234	**	-53.411	**		-110	**
	-10.62			-7.57		-11.55		-16.55			-9.4	
Inequality in surrounding 2.5 miles	309.698	**		71.861	**	37.3361	**	47.2259	**		331.58	**
	28.61			13.94		6.57		7.41			14.55	
Intercept	-8.0763	**		6.2898	**	2.1292	*	12.1992	**		6.0332	†
	-5.01			8.2		2.52		12.86			1.78	
** $p < .01$ (two-tail test), * $p < .05$ (two-tail test), † $p < .05$ (one-tail test). T-values below coefficient estimates. Negative binomial regression models. $N = 29,157$ egohoods												

Spatial Inequality and Crime

Table 3. Interaction models predicting change in crime from 2000 to 2010

	Aggravated assault	Robbery	Burglary	Motor vehicle theft	Larceny
<i>Change in egohood</i>					
Income Inequality	1.7359	-0.744	1.4826	-0.905	-5.7898
	0.88	-0.8	1.43	-0.78	-1.39
Average household income	-1.8525 *	-0.8918 *	-0.6437	-0.2903	-0.6738
	-2.06	-2.1	-1.37	-0.55	-0.36
Racial/ethnic heterogeneity	28.6037 **	2.8244	1.692	1.8876	30.171 **
	7.82	1.64	0.88	0.88	3.93
<i>Change in surrounding area</i>					
Income Inequality	-7.9605 *	-30.071 **	-12.464 **	-4.4887 *	-87.563 **
	-2.32	-18.59	-6.95	-2.23	-12.17
Average household income	-25.417 **	-22.36 **	-12.077 **	-9.6117 **	-77.211 **
	-12.05	-22.45	-10.94	-7.76	-17.42
Racial/ethnic heterogeneity	50.9482 **	11.6738 **	23.9835 **	22.4781 **	82.625 **
	10.17	4.93	9.15	7.64	7.85
<i>Change in broader 2.5 area</i>					
Average income in surrounding 2.5 miles	-65.503 **	-22.95 **	-34.765 **	-52.934 **	-110 **
	-11.91	-8.83	-12.07	-16.38	-9.45
Inequality in surrounding 2.5 miles	188.462 **	27.7296 **	7.519	47.3557 **	312.38 **
	14.44	4.5	1.1	6.18	11.39
<i>Interactions</i>					
Egohood inequality X nearby inequality	-16.069	-110 **	-43.529 **	42.2725 **	-210 **
	-1.22	-17.9	-6.29	5.44	-7.67
Egohood inequality X racial heterogeneity	68.9863 **	24.1965 **	21.5654 **	30.1545 **	72.08 *
	4.51	3.35	2.7	3.36	2.24
Nearby inequality X racial heterogeneity	-64.677 †	31.3009 †	-2.0426	18.2376	30.288
	-1.86	1.9	-0.11	0.89	0.41

Spatial Inequality and Crime

Egohood inequality X inequality in surrounding 2.5 miles	103.707			118.819 **			141.447 **			-17.881			1300 **
	1.45			3.52			3.78			-0.43			8.8
Nearby inequality X inequality in surrounding 2.5 miles	-600 **			180.392 **			-61.056			-290 **			32.078
	-5.38			3.4			-1.04			-4.4			0.14
Egohood income X inequality in surrounding 2.5 miles	502.119 **			183.44 **			129.822 **			5.7793			145.19 *
	16.95			13.11			8.37			0.33			2.33
Intercept	-0.594			8.2372 **			2.7041 **			12.6099 **			1.1996
	-0.37			10.94			3.24			13.46			0.36

*** p < .01 (two-tail test), * p < .05 (two-tail test), † p < .05 (one-tail test). T-values below coefficient estimates. Negative binomial regression models. N = 29,157 egohoods. Models include all control variables listed in Table 2.*

Figure 1. Effect of changing egohood and nearby inequality on change in robberies

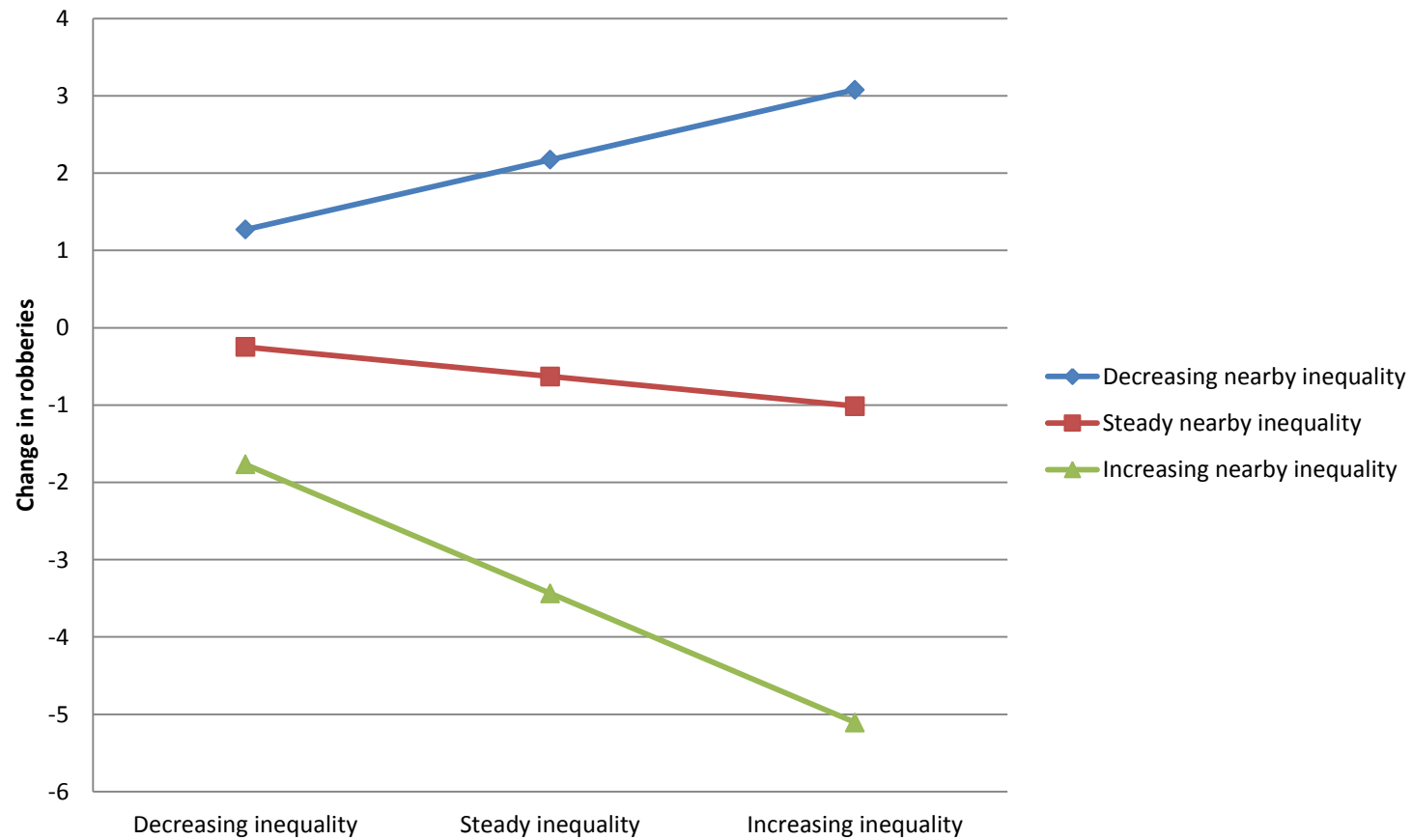


Figure 2. Effect of changing inequality in egohood and within 2.5 miles on change in aggravated assaults

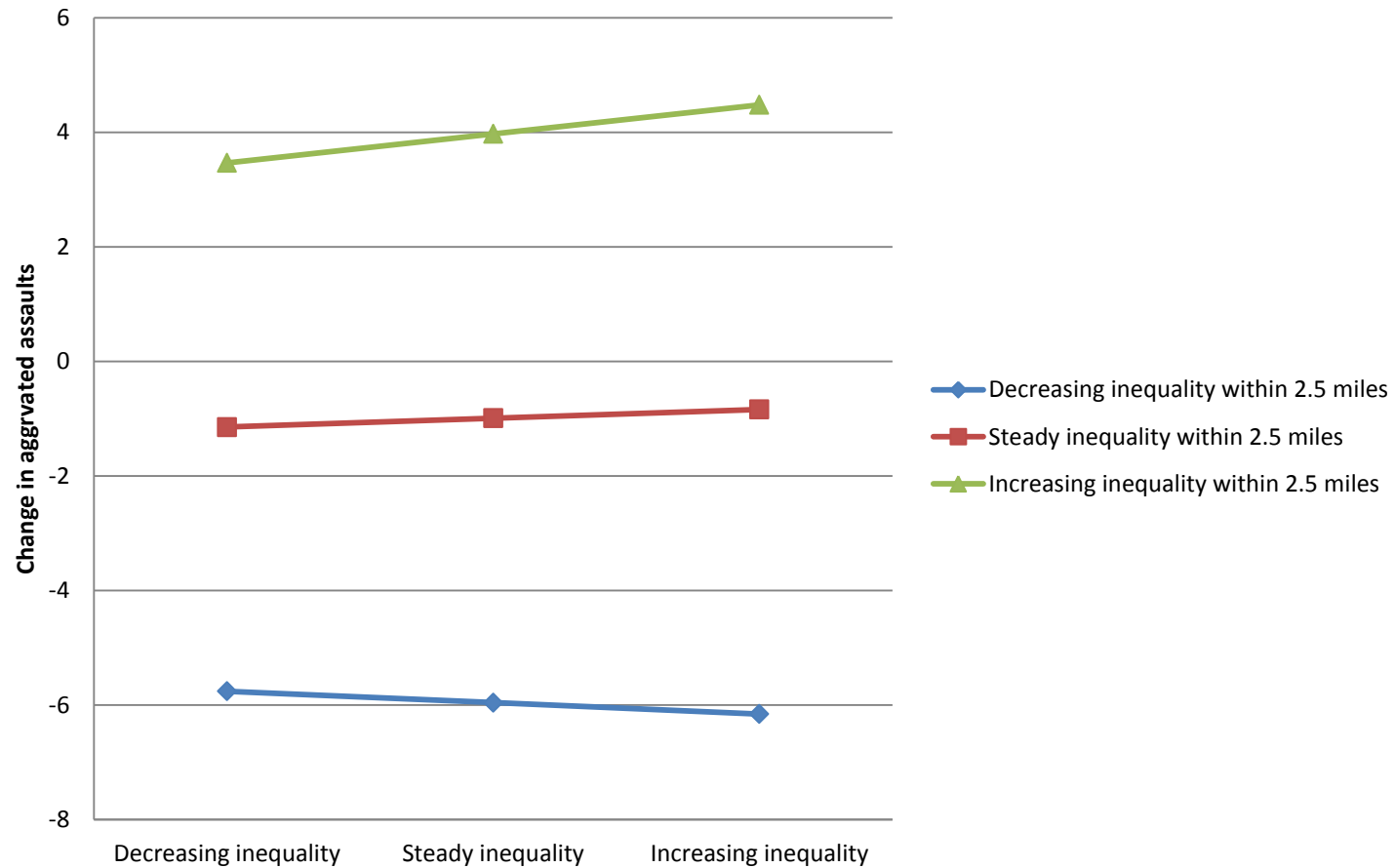


Figure 3. Effect of changing egohood inequality and racial heterogeneity on changing burglaries

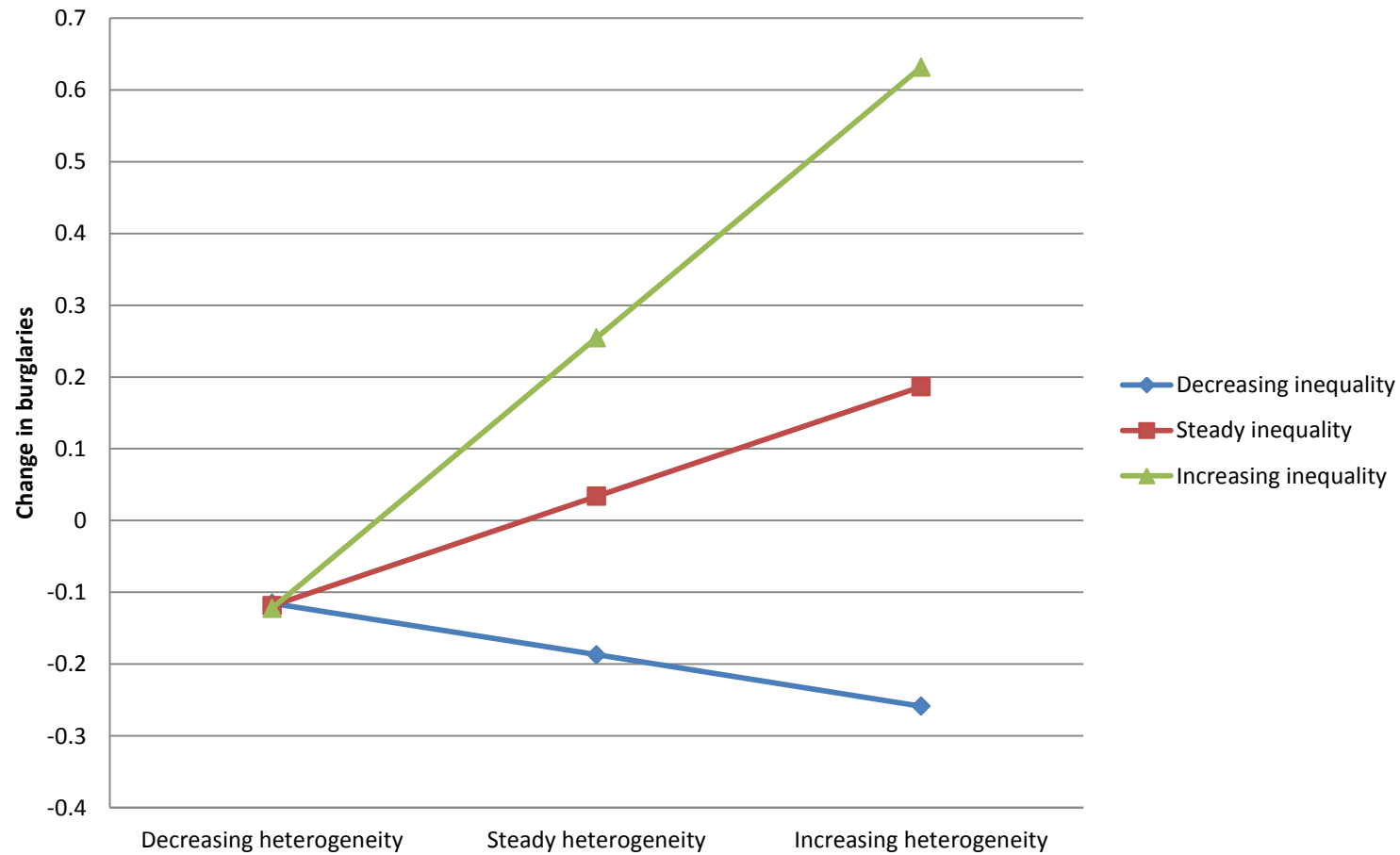


Figure 4. Effect of changing ego-hood inequality and racial heterogeneity on change in aggravated assaults

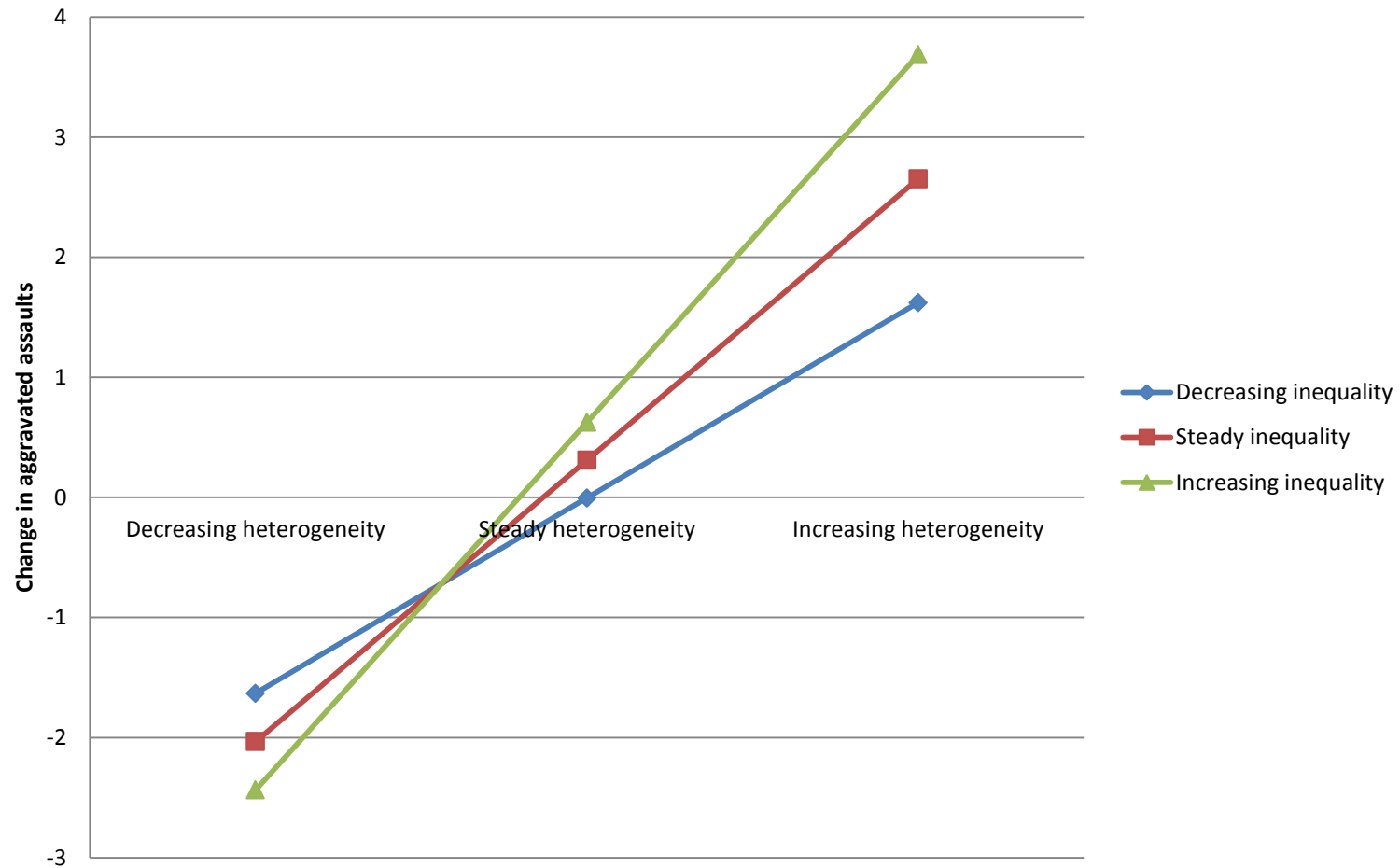


Figure 5. Effect of changing income in egohood and inequality within 2.5 miles on change in aggravated assaults

